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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/588,118

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Bernadette Charleux

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ARKEMA INC.

PATENT DEPARTMENT - 26TH FLOOR

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PHILADELPHIA, PA 19103-3222

EXAMINER

FINK, BRIEANN R

ART UNIT

PAPER NUMBER

1796

MAIL DATE

DELIVERY MODE

04/21/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/588,118	Applicant(s) CHARLEUX ET AL.	
	Examiner Briann R. Fink	Art Unit 1796	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 February 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 11 and 13-28 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 11 and 13-28 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 August 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This Office action follows a reply filed on February 17, 2009. Claims 11, 13-18, 20, and 25 have been amended. Claim 12 has been canceled. Claims 11 and 13-28 are currently pending and under examination.
2. The texts of those sections of Title 35 U.S. Code are not included in this section and can be found in a prior Office action.
3. Applicant's arguments, see p. 7-9, filed February 17, 2009, with respect to the rejection(s) of claim(s) claims 11 and 13-28 under 35 U.S.C. 103(a) have been fully considered and are persuasive.
4. The rejection of claims 11-15 over 35 U.S.C. 103(a) over *Callais et al.* (US 2003/0149205) is withdrawn
5. The rejection of claims 11-28 over 35 U.S.C. 103(a) over *Charleux et al.* (US 6,353,065), in view of *Callais et al.* (US 2003/0149205) is withdrawn. However, upon further consideration, a new ground of rejection is made over *Charleux et al.* in view of *Callais et al.*, and further in view of *Hwa et al.* (3,546,154).

Claim Rejections - 35 USC § 112

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.
7. Claim 15 recites the limitation "m is greater than or equal to 2" in line 2. There is insufficient antecedent basis for this limitation in the claim.

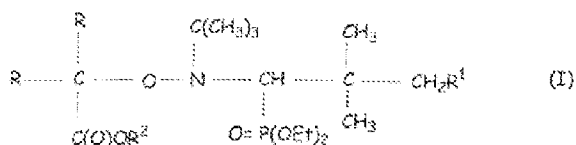
Claim 15 is further limiting the variable m dependent from claim 11; however, claim 11 does not consist of a variable m.

Double Patenting

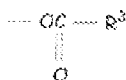
8. Claims 11, 13-14, and 18-19 are provisionally rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 4-5 and 8 of copending Application No. 10/523481. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following:

Claims 11 and 13-14 claim a process for emulsion polymerization of at least one monomer which is polymerized via radical polymerization, carried out in the presence of at least one of the claimed monoalkoxyamines.

Application '481 claims a method for polymerization of at least one monomer which can be polymerized by the radical route under conditions, such as emulsion/miniemulsion, by reacting at least one monomer with a claimed alkoxyamine as follows:



in which R represents a linear or branched alkyl radical having a number of carbon atoms ranging from 1 to 3, R¹ represents a hydrogen atom or a residue:



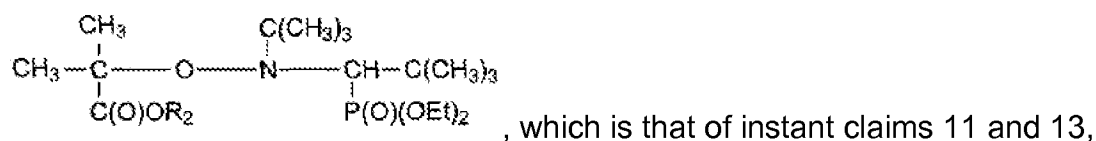
in which R³ represents a linear or branched alkyl radical having a number of carbon atoms ranging from 1 to 20, and R² represents a hydrogen atom, a phenyl radical, an alkali metal, H₄N⁺, Bu₄N⁺ or Bu₃HN⁺

(claim 4).

Application '481 further limits this alkoxyamine (claim 5), where

$R = CH_3$ -, $R^1 = H$ and R^2 is selected from the group consisting of H, CH_3 , $(CH_3)_3C$, Li and Na.

This limitations result in an alkoxyamine as follows:



when R_2 is Li or Na.

Claims 18 and 19 claim the process where the monomers have a carbon-carbon double bond, which are further listed in claim 19.

Application '481 claims the same monomers (claim 8).

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

Claim Rejections - 35 USC § 103

9. Claims 11-28 rejected under 35 U.S.C. 103(a) as being unpatentable over *Charleux et al.* (US 6,353,065), in view of *Callais et al.* (US 2003/0149205), and further in view of *Hwa et al.* (3,546,154).

Charleux et al. teaches a process for emulsion polymerization in the presence of a stable free radical resulting in a latex solution of polymer particles through controlled polymerization (col. 1, ll. 11-20). The stable free radical is that of a nitroxide radical, which can be cyclic or acyclic, and can have a phosphoryl group in the β -position with respect to the nitrogen of the nitroxide radical (col. 3, l. 56 – col. 4, l. 41).

Charleux et al. also teaches that the stable free radical can be introduced into the polymerization medium in the form of a stable free radical or in the form of a molecule comprising a group capable of generating a stable free radical during the polymerization, such that the group generating the stable free radical is a polymerization initiator and an emulsifying agent itself (col. 6, ll. 3-21). The emulsifying agent exhibits a carbon containing chain, preferably of at least 5 carbon atoms, in the presence of a stable free radical and a free radical initiator, such as organic peroxides and hydroperoxides, to pull a hydrogen off from the hydrocarbon chain (col. 6, ll. 21-49).

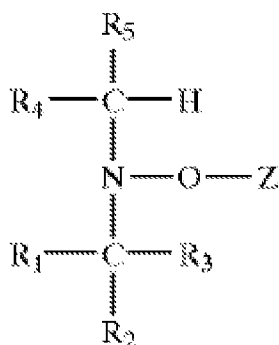
The stable free radical is preferably introduced into the polymerization medium at least partially bonded to an emulsifying agent (col. 6, ll. 50-53). The emulsifying agent is a surfactant making it possible to stabilize the emulsion, and can be any standard emulsifying agent including those that are cationic, anionic, nonionic, amphoteric, quaternary or fluorinated (col. 6, ll. 62-67). One emulsifying agent specifically mentioned is that of sodium stearate, an 18 carbon carboxylate.

Note the suggestion by *Charleux et al.* that a bond forms between the nitroxyl and a carboxylate. Chemically, this bond would form between the α -carbon of the carboxylate and the nitroxide radical. The hydrogen bonded to the α -carbon of a carboxylate is the most acidic of the carbon chain and therefore most easily removed; therefore, as suggested by *Charleux et al.*, the free radical initiator would remove a hydrogen from the α -carbon allowing for a bond to form

between the carboxylate and nitroxyl, resulting in the same chemical bonding as formula (I) of the instant invention.

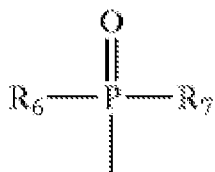
Charleux et al. does not specifically teach the structure of the applicant's alkoxyamine of formula (I); however, the combination of the emulsifying agent and nitroxide of *Charleux et al.* results in the alkoxyamine of *Callais et al.*, as shown below.

Callais et al. discloses a process for controlled radical polymerization of acrylic and related polymers (Abstract), by using a controlled free radical initiator of N,N-dialkyl-alkoxyamines (p. 1, [0008]). The following is a general structure:



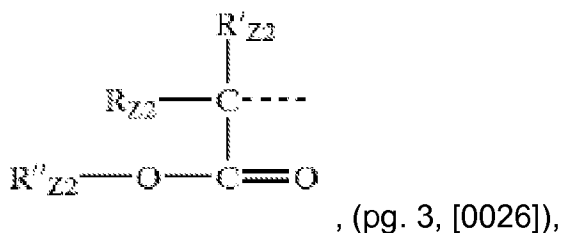
(pg. 2, [0019]),

where R_1 , R_2 , R_3 , and R_4 are straight chain or branched chain alkyl groups of 1 to 50 carbon atoms (p. 2, [0020]), R_5 is the following:



(pg. 3, [0035]),

such that R_6 and R_7 are straight chain alkoxy groups (p. 3, [0036]), and Z is the following:



Where, R_{Z2} , R'_{Z2} are straight chain or branched chain alkyl groups of 1 to 50 carbon atoms (p. 3, [0027]). Through the teaching of *Charleux et al.*, R''_{Z2} is sodium.

Therefore, one of ordinary skill in the art at the time the invention was made would have found it obvious to obtain the general structure of *Callais et al.* through the teachings of *Charleux et al.* However, this combination differs from the instant invention by the number of carbons of the carbon chain of the emulsifying agent, or as above, R_{Z2} , R'_{Z2} .

Although *Charleux et al.* teaches the emulsifying agent to have at least 5 carbons, the preferred agents have much longer carbon chains, such as that of sodium stearate, having an carbon chain having 18 carbons, where the instant invention requires a carbon chain of between 2 and 6 carbons long (if both R_1 and R_3 are 1 or 3 carbons long, of instant claim 11).

Hwa et al. teaches emulsion polymerization of vinyl monomers, focusing on the stabilization of the emulsion as well as controlling the particle size of the final polymer (col. 1, ll. 29-33). *Hwa et al.* teaches that the final product largely depends on the emulsifying agent, which prepares the monomers for polymerization (col. 1, ll. 54-57). *Hwa et al.* teaches that emulsifying agents with

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hydrocarbon chains of less than 10 carbons, "poor soaps", are typically thought of as not being useful as emulsifiers, because large amounts would be required to reach the critical micelle concentration (CMC level), resulting in a slow rate of polymerization; however, *Hwa et al.* teaches that employing an emulsifying agent having a carbon chain of from 5 to 9 carbons long permits controlled polymerization at a rapid rate to obtain a stable polymeric lattice of very uniform particle size (col. 2, ll. 5-10). "Poor soaps" are preferably the alkali metal or ammonium alkyl sulfates, sulfonates, and carboxylates containing from 5 to 9 carbon atoms in either branched or straight chain form (col. 2, ll. 41-45). The process of *Hwa et al.* utilizes both short and long chain emulsifying agents to obtain the best results, which results in high molecular weight polymers having a very large size, exhibiting very good particle size uniformity without elaborate reaction controls (col. 3, ll. 15-20). The long chain emulsifying agents alone result in a wide range of particle size (col. 3, ll. 24-26). Note the applicants' use of an emulsifying agent, Dowfax 3890, in addition to the alkoxyamine (see instant specification, Examples 3-8, p. 17-24).

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have shortened the carbon chains (R_{Z2} , R'_{Z2}) of *Charleux et al.* in view of *Callais et al.* as suggested by *Hwa et al.* to a linear or branched hydrocarbon chain of 5-9 carbons because it would improve the final polymer of the emulsion polymerization of *Charleux et al.* in view of *Callais et al.*, such as uniformity in particle size.

Further, one of ordinary skill in the art knows that as an alkyl chain of a molecule is shortened, the molecule becomes more water-soluble.

Therefore, one of ordinary skill in the art would expect the alkoxyamine of *Charleux et al.* in view of *Callais et al.* with shortened alkyl chains, as suggested by *Hwa et al.*, to be water soluble, as required by instant claim 11.

As to claims 16-17, *Charleux et al.* teaches the addition of 0.686 g of an alkoxyamine and 17.5 g of a monomer in Example 10 (col. 16, ll. 46 and 51), which is approximately 4% of alkoxyamine by weight of one monomer.

As to claims 18-19, *Charleux et al.* teaches monomers and combinations of monomers with the following functionalities: vinyls, such as methacrylates and vinylaromatics; vinylidenes, such as vinylidene fluoride; dienes, such as butadiene and isoprene; olefinic monomers, such as ethylene and butane; and allylic monomers (col. 7, l. 56 – col. 8, l. 62).

As to claims 20 and 21, *Charleux et al.* teaches an emulsion carried out with stirring of an aqueous phase of water, the initiator and emulsifying agent (carrying a group generating the stable free radical), and an organic phase of the monomer, an optional solvent, and an optional cosolvent (col. 10, l. 64 - col. 11, l. 8). The cosolvent is further defined as a liquid at the polymerization temperature, exhibiting a solubility in water at 25°C of less than 1×10^{-6} g/L (col. 7, ll. 37-40). The process is carried out at a temperature ranging from 50 to 140°C, and at a pressure sufficient to prevent the phases of the emulsion from boiling and sufficient for its various constituents to remain essentially in the emulsion (col.

11, ll. 9-17). The shearing is sufficient for producing the miniemulsion state and can be obtained by ultrasound (col. 7, ll. 50-52)

As to claim 22, *Charleux et al.* teaches a process for the preparation of multiblock polymers, such that a first block is prepared. When the first monomer is consumed by the reaction, a second monomer intended for the second block is added to the polymerization without stopping the stirring and without cooling or other interruption. A third block can be added in the same way as the second (col. 9, ll. 8-41).

As to claims 23-28, *Charleux et al.* teaches that the emulsion process results in a polymer latex of polymer particles with a mean diameter of less than 2 μm and generally between 20 and 1000 nm (col. 11, ll. 22-25). The particles can be block polymers and more specifically those including the following: polystyrene-b-poly(methyl methacrylate), polystyrene-b-polystyrenesulphonate, polystyrene-b-polyacrylamide, polystyrene-b-polymethacrylamide, etc. (col. 11, ll. 32-37 and col. 9, l. 42 – col. 10, l. 9).

Response to Arguments

10. Applicants' arguments, see p. 7-9, filed February 17, 2009, with respect to the emulsion process using specific alkoxyamines claimed in claims 11 and 13-28 have been fully considered and are persuasive. The rejections of claims 11 and 13-28 have been withdrawn; however, as noted above, a new rejection further in view of *Hwa et al.* is proposed below.

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- a. The rejection over claims 11 and 13-15 over *Callais et al.* has been withdrawn.

In order to meet the limitations of instant claim 11, one of ordinary skill in the art would have had to find the salts of the alkoxyamines of *Callais et al.* as obvious variants, and have found it obvious to apply them in an emulsion.

- b. The rejection over claims 16-28 over *Callais et al.* in view of *Charleux et al.* has been withdrawn.

In order to meet the limitations of instant claim 11, one of ordinary skill in the art one would have had to find it obvious to have shortened the alkyl groups of the alkoxyamines of *Charleux et al.*; however, neither *Charleux et al.* nor *Callais et al.* teach or suggest the shortening of these groups. *Hwa et al.* does teach the advantage of having shorter alkyl groups on an emulsifier, therefore, as shown above, claims 11 and 13-28 are rejected further in view of *Hwa et al.*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Briemann R. Fink whose telephone number is (571)270-7344. The examiner can normally be reached on Monday through Friday, 7:00 AM to 4:30 PM (EST).

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Randy P. Gulakowski can be reached on (571)272-1302. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/B. R. F./
Examiner, Art Unit 1796

/Randy Gulakowski/
Supervisory Patent Examiner, Art Unit 1796